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Claims

1 1. A method for transmitting data in real time from a sender to a receiver in a
2 digital communications network, comprising the steps of:
3 maintaining an estimate of bandwidth available from the sender to the
4 receiver; and
5 adjusting transmission based on the estimate in order to maintain real time
6 transmission.

1 2. The method according to claim 1, wherein the data comprises compressed
2 video data.

1 3. The method according to claim 1, wherein maintaining the estimate of
2 bandwidth comprises monitoring of packet loss based on acknowledgments from the
3 receiver.

4 4. The method according to claim 1, wherein, in maintaining the estimate of
5 bandwidth, the sender maintains a count of packets outstanding.

1 5. The method according to claim 4, wherein, in maintaining the estimate of
2 bandwidth, the sender maintains current an upper bound on how many packets are allowed
3 to be outstanding.

1 6. The method according to claim 5, wherein the upper bound is as specified
2 by the TCP congestion window.

1 7. The method according to claim 1, wherein, in maintaining the estimate of
2 bandwidth, the sender maintains a count of bytes outstanding.

1 8. The method according to claim 7, wherein, in maintaining the estimate of
2 bandwidth, the sender maintains current an upper bound on how many bytes are allowed to
3 be outstanding.

1 9. The method according to claim 8, wherein the upper bound is as specified
2 by the TCP congestion window.

1 10. The method according to claim 1, further comprising retransmitting a
2 packet which has been determined by the receiver as having been lost in transmission or
3 received with an error.

1 11. The method according to claim 1, further comprising adapting bandwidth
2 required by the data.

1 12. The method according to claim 1, further comprising discriminating
2 between packets lost due to congestion in the network and packets received with at least
3 one bit error.

1 13. A system for transmitting data in real time from a sender to a receiver in a
2 digital communications network, comprising:
3 means for maintaining an estimate of bandwidth available from the sender
4 to the receiver; and
5 means for adjusting transmission based on the estimate in order to maintain
6 real time transmission.

1 14. The system according to claim 13, wherein the data comprises compressed
2 video data.

1 15. The system according to claim 13, wherein the means for maintaining the
2 estimate of bandwidth comprises means for monitoring of packet loss based on
3 acknowledgments from the receiver.

4 16. The system according to claim 13, wherein the means for maintaining the
5 estimate of bandwidth comprises means for maintaining a count of packets outstanding.

1 17. The system according to claim 16, wherein the means for maintaining the
2 estimate of bandwidth comprises means for maintaining current an upper bound on how
3 many packets are allowed to be outstanding.

1 18. The system according to claim 17, wherein the upper bound is as specified
2 by the TCP congestion window.

1 19. The system according to claim 13, wherein the means for maintaining the
2 estimate of bandwidth comprises means for maintaining a count of bytes outstanding.

1 20. The system according to claim 19, wherein the means for maintaining the
2 estimate of bandwidth comprises means for maintaining current an upper bound on how
3 many bytes are allowed to be outstanding.

1 21. The system according to claim 20, wherein the upper bound is as specified
2 by the TCP congestion window.

1 22. The system according to claim 13, further comprising means for
2 retransmitting a packet which has been determined by the receiver as having been lost in
3 transmission or received with an error.

1 23. The system according to claim 13, further comprising means for adapting
2 bandwidth required by the data.

1 24. The system according to claim 13, further comprising means for
2 discriminating between packets lost due to congestion in the network and packets received
3 with at least one bit error.

1 25. A system for transmitting data in real time from a sender to a receiver in a
2 digital communications network, comprising a processor which is instructed for:

3 maintaining an estimate of bandwidth available from the sender to the
 4 receiver; and
 5 adjusting transmission based on the estimate in order to maintain real time
 6 transmission.

1 26. The system according to claim 25, wherein the data comprises compressed
 2 video data.

1 27. The system according to claim 25, wherein maintaining the estimate of
 2 bandwidth comprises monitoring of packet loss based on acknowledgments from the
 3 receiver.

4 28. The system according to claim 25, wherein, in maintaining the estimate of
 5 bandwidth, the sender maintains a count of packets outstanding.

1 29. The system according to claim 28, wherein, in maintaining the estimate of
 2 bandwidth, the sender maintains current an upper bound on how many packets are allowed
 3 to be outstanding.

1 30. The system according to claim 29, wherein the upper bound is as specified
 2 by the TCP congestion window.

1 31. The system according to claim 25, wherein, in maintaining the estimate of
 2 bandwidth, the sender maintains a count of bytes outstanding.

1 32. The system according to claim 31, wherein, in maintaining the estimate of
 2 bandwidth, the sender maintains current an upper bound on how many bytes are allowed to
 3 be outstanding.

1 33. The system according to claim 32, wherein the upper bound is as specified
 2 by the TCP congestion window.

1 34. The system according to claim 25, wherein the processor is instructed
2 further for retransmitting a packet which has been determined by the receiver as having
3 been lost in transmission or received with an error.

1 35. The system according to claim 25, wherein the processor is instructed
2 further for adapting bandwidth required by the data.

1 36. The system according to claim 25, wherein the processor is instructed
2 further for discriminating between packets lost due to congestion in the network and
3 packets received with at least one bit error.

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